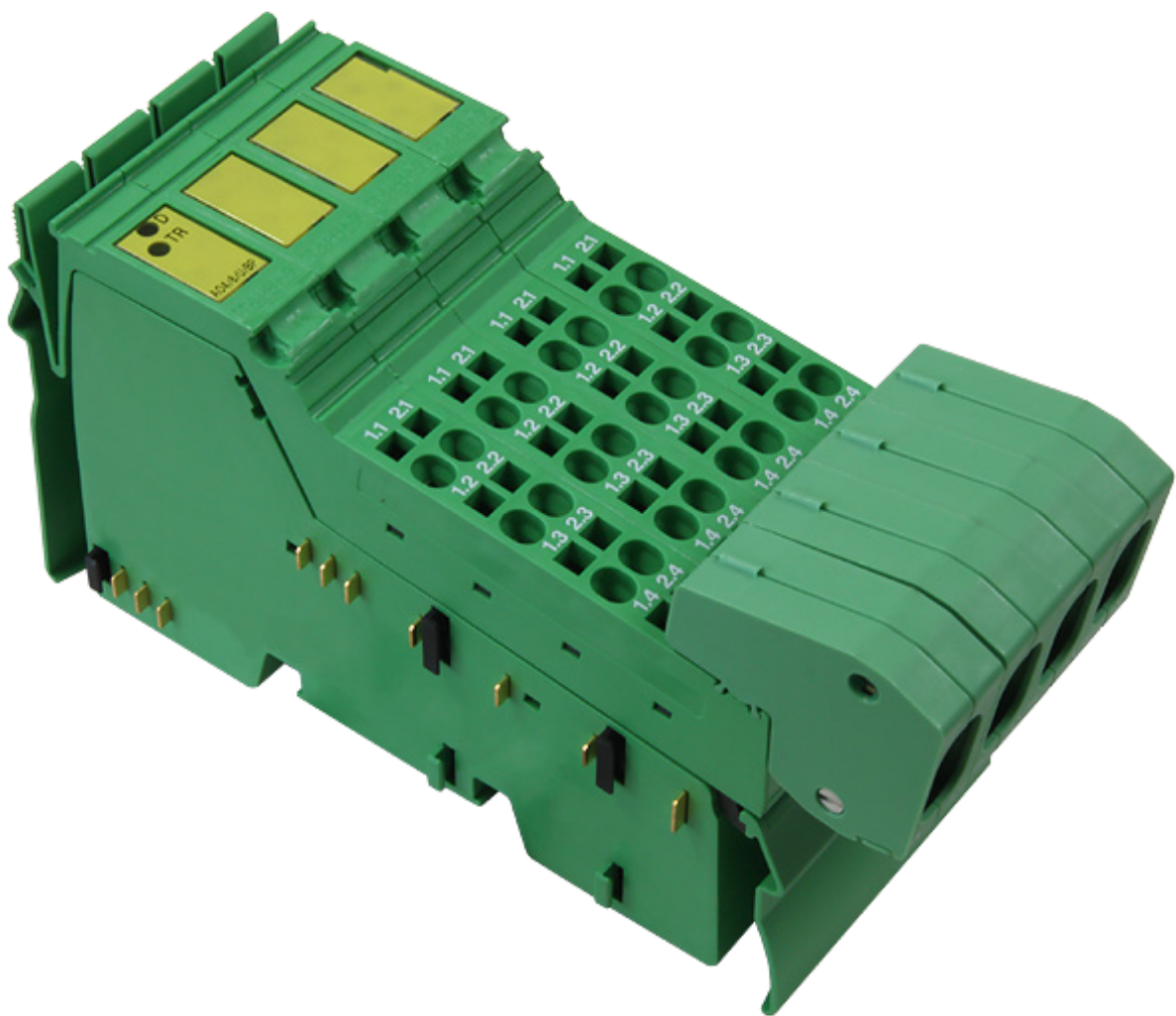

Inline terminal: 8 analog signal outputs ILT AO 4/8/U/BP

Device description



This manual is intended to provide support for installation and usage of the device. The information is believed to be accurate and reliable. However, SysMik GmbH Dresden assumes no responsibility for possible mistakes and deviations in the technical specifications. SysMik GmbH Dresden reserves the right to make modifications in the interest of technical progress to improve our modules and software or to correct mistakes.

We are grateful to you for criticism and suggestions. Further information (device description, available software) can be found on our homepage www.sysmik.de. Please ask for latest information.

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Contents

Device description	1
Contents	3
1 Description	4
2 Order information	4
3 Technical data	5
4 Local diagnostic and status indicators / Terminal point assignment	8
4.1 Function identification	8
4.2 Terminal point assignment per each connector	8
5 Internal circuit diagram	9
6 Electrical isolation	10
7 Installation instruction	10
8 Connection notes	11
9 Connection example	11
10 Connecting shielded cables using the shield connector	12

1 Description



Note: This device description is only valid in association with the IL SYS INST UM user manual or the Inline system manual of the specifically used bus system.

Make sure you always use the latest documentation – it can be downloaded at www.sysmik.de.

The terminal is designed for use within an Inline station. This terminal provides an 8-channel output module to output analog standard voltage signals.

Features

- Eight analog signal outputs
- Actuator connection in 2-wire technology with shield connection
- Channels are configured independently of one another
- Diagnostic indicator

2 Order information

Description	Type	Part number	Pcs./Pkt.
Inline terminal with eight analog output channels for analog standard voltage signals; complete with accessories (connectors and labeling fields), transmission speed: 500 kbps	ILT AO 4/8/U/BP	1225-100492-01-5	1

Optional Add-Ons (Purchase via Phoenix Contact):

Description	Type	Part no.	Pcs./Pkt.
Inline shield connector for analog Inline terminals	IB IL SCN 6-SHIELD-TWIN	2740245	5
Shield connection clamp for applying the shield on busbars	SK 8	3025163	10
Shield connection clamp for applying the shield on busbars	SK 14	3025176	10
Shield connection clamp for applying the shield on busbars	SK 20	3025189	10
Shield connection clamp for applying the shield on busbars	SK 35	3026463	10
Support for mounting on the NS 35/7,5 DIN rail, for 10 mm x 3 mm busbars	AB-SK	3025341	10
Support for direct mounting with contact to the mounting surface	AB-SK 65	3026489	10
Support, made of insulation material, with fixing screws, can also be used for 10 mm x 3 mm or 6 mm x 6 mm busbars	AB-SK/E	3026476	10
PEN conductor busbar, 3 x 10 mm, length: 1000 mm	NLS-CU 3/10 SN 1000MM	0402174	10
Power terminal, cross section: 0,5 – 4 mm ² , width: 7 mm	AK 4	0404017	50
Power terminal, cross section: 0,5 – 4 mm ² , width: 7 mm, color: green-and-yellow	AK 4 GNYE	0421029	50
Power terminal, cross section: 0,5 - 4 mm ² , width: 7 mm, color: black	AKG 4 BK	0421032	50
User manual: "Automation Terminals of the Inline Product Range"	IL SYS INST UM	2698737	1
User manual: "Configuring and Installing the INTERBUS Inline Product Range"	IB IL SYS PRO UM	2743048	1

3 Technical data

General Data	
Housing dimensions (width x height x depth)	48.8 mm x 120 mm x 71.5 mm
Weight	125 g (without connectors), 215 g (with connectors)
Connection method for actuators	2-wire technology with shield connection
Ambient temperature (operation)	-25 °C to +55 °C
Ambient temperature (storage/transport)	-25 °C to +85 °C
Permissible humidity (operation/storage/transport)	10 % to 95 % according to DIN EN 61131-2
Permissible air pressure (operation/storage/transport)	70 kPa to 106 kPa (up to 3000 m above sea level)
Degree of protection	IP20 according to IEC 60529
Class of protection	Class 3 according to VDE 0106, IEC 60536
Connection data for Inline connector	
Connection method	Spring-cage terminals
Conductor cross-section	0.2 mm ² to 1.5 mm ² (solid or stranded), 24 – 16 AWG

Interface	
Local bus	Data routing
Transmission speed	500 kBit/s

Power consumption	500 kBit/s
Communications power U_L	7,5 V DC
Current consumption from U_L	80 mA (typical)
I/O supply voltage U_{ANA}	24 V DC
Current consumption at U_{ANA}	72 mA (typical)
Total power consumption	2,35 W (typical)

Supply of the Module Electronics and I/O Through the Bus Coupler/Power Terminal	
Connection method	Potential routing

Analog Outputs		
Number	Eight analog voltage outputs	
Connection of the signals	2 or 3-wire, shielded twisted pair cable	
Signals	0 V to 10 V, 0 V to 5 V, ± 10 V, ± 5 V	
Representation of output value	16 bits (15 bits with sign bit) or 8 bits (7 bits with sign bit)	
Resolution of the DAC	16 bits	
Resolution (quantization)	Inline format	
0 V to 10 V	0 V to 10.837 V	V0.333 mV/LSB
0 V to 5 V	0 V to 5.419 V	V0.167 mV/LSB
± 10 V	-10.837 V to +10.837 V	0.333 mV/LSB
± 5 V	-5.419 V to +5.419 V	0.167 mV/LSB
Basic error limit	Voltage: ± 0.1 % (typical) of the output range final value	
Output load	2 kW, minimum, 30 kW, typical	
Actuator cable length	250 m, maximum, using shielded cable 10 m, maximum, using unshielded cable	

Safety Equipment	
Transient protection of analog outputs	Yes
Short-circuit protection of analog outputs	Yes, for at least 1 minute

Electrical Isolation	
Common Potentials	
24 V main voltage U_M , 24 V segment voltage U_S , and GND have the same potential. FE is a separate potential area.	
Separate Potentials in the Terminal	
Test Distance	Test Voltage
7.5 V supply voltage / ± 15 V	500 V AC, 50 Hz, 1 min
7.5 V supply voltage (bus logic) / functional earth ground	500 V AC, 50 Hz, 1 min
± 15 V-, +5 V analog supply (analog I/O) / functional earth ground	500 V AC, 50 Hz, 1 min

Error Messages to the Higher-Level Control or Computer System	
Failure of the internal I/O voltage supply	Yes, I/O error message sent to the bus coupler
Failure of or insufficient communications power U_L	Yes, I/O error message sent to the bus coupler

Tolerance and Temperature Response


Note: The tolerance values refer to the measuring range final value at a typical load (30 kΩ).

$T_A = 25^\circ\text{C}$

Output range	Absolute (typical)	Absolute (maximum)	Relative (typical)	Relative (maximum)
0 V to 5 V, ± 5 V	± 18 mV	± 25 mV	± 0.36 %	± 0.50 %
0 V to 10 V, ± 10 V	± 19 mV	± 25 mV	± 0.19 %	± 0.25 %

$T_A = -25^\circ\text{C} \dots +55^\circ\text{C}$

Output Range	Absolute (typical)	Absolute (maximum)	Relative (typical)	Relative (maximum)
0 V to 5 V, ± 5 V	± 22 mV	± 40 mV	± 0.44 %	± 0.80 %
0 V to 10 V, ± 10 V	± 26 mV	± 40 mV	± 0.26 %	± 0.40 %

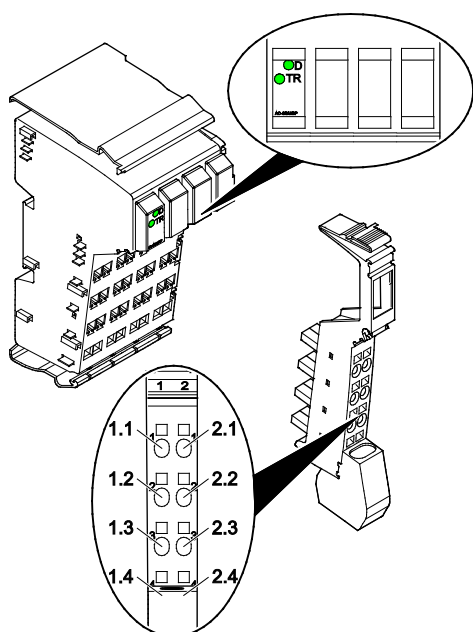
Additional Tolerances Influenced by Electromagnetic Fields

Type of Electromagnetic -Interference	Typical Deviation of the Output Range Final Value (Relative)
Electromagnetic fields; field strength 10 V/m according to EN 61000-4-3/IEC 61000-4-3	$< \pm 0.5$ %
Conducted interference Class 3 (test voltage 10 V) according to EN 61000-4-6/IEC 61000-4-6	$< \pm 0.5$ %
Fast transients (burst) 4 kV supply, 2 kV input according to EN 61000-4-4/IEC 61000-4-4	$< \pm 0.5$ %

Approvals

Information on current approvals can be found on the Internet at www.sysmik.de.

4 Local diagnostic and status indicators / Terminal point assignment



Designation	Color	Meaning
D	green	Diagnostics
TR	green	PCP active

Fig. 1: Terminal with appropriate connector

4.1 Function identification

yellow

4.2 Terminal point assignment per each connector

Terminal point	Signal	Assignment
1.1	U_1	Voltage output 1
2.1	U_2	Voltage output 2
1.2, 2.2	–	Not used
1.3, 2.3	AGND	Ground of voltage output
1.4, 2.4	Shield	Shield connection

5 Internal circuit diagram

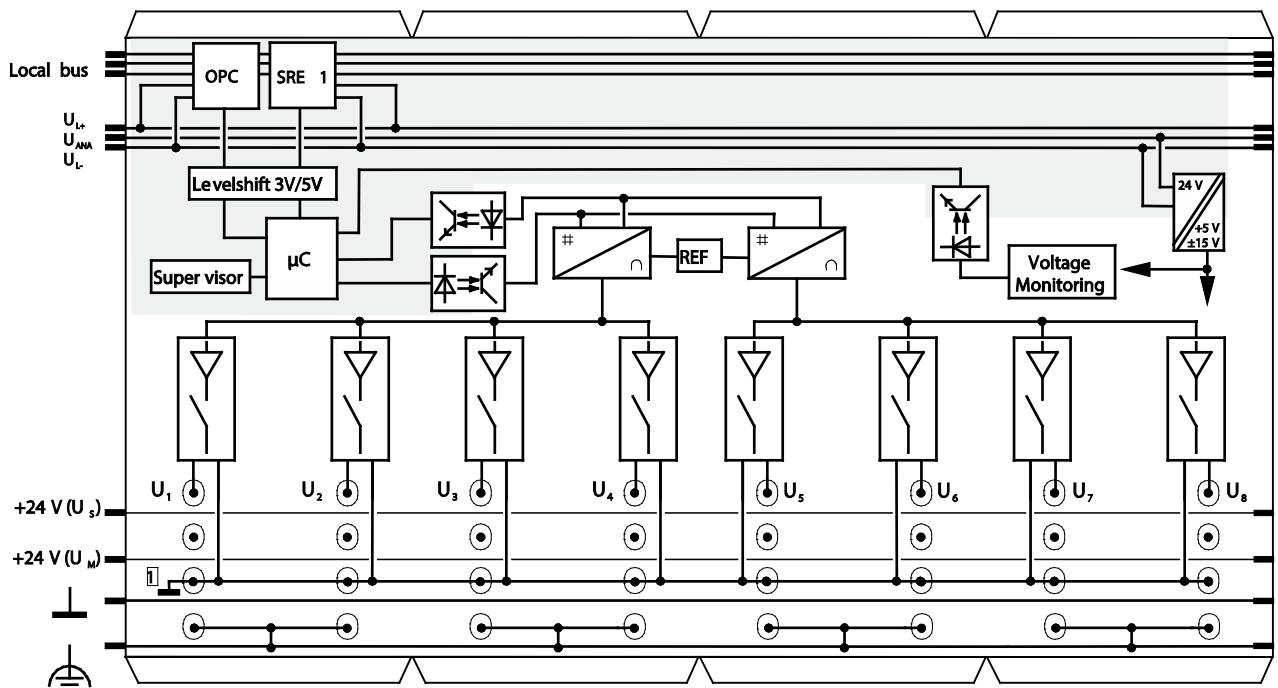




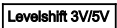
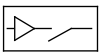








Fig. 2: Internal wiring of terminal points

Key:

	Protocol chip		Digital/analog converter
	Register expansion		Reference voltage
	Level adaption		Output level
	Hardware monitoring		Voltage monitoring
	Microcontroller		DC/DC converter with electrical isolation
	Optocoupler		Analog ground, electrically isolated from ground of the potential jumper



Note: Other symbols used are explained in the IL SYS INST UM E user manual or in the Inline system manual for your bus system.

6 Electrical isolation

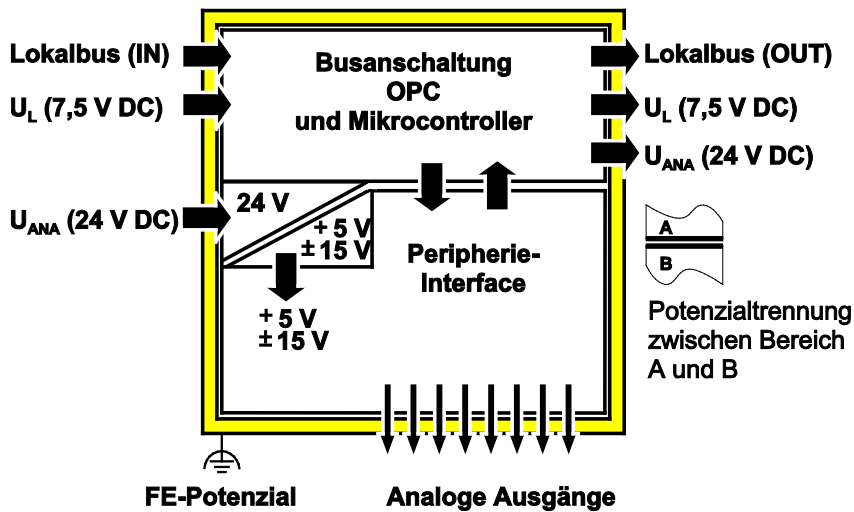


Fig. 3: Electrical isolation of the individual function areas

7 Installation instruction

High current flowing through potential jumpers U_M and U_S leads to a temperature rise in the potential jumpers and inside the terminal. Observe the following instructions to keep the current flowing through the potential jumpers of the analog terminals as low as possible:



Create a separate main circuit for the analog terminals!

If this is not possible in your application and if you are using analog terminals in a main circuit together with other terminals, place the analog terminals behind all the other terminals at the end of the main circuit.

8 Connection notes



Analog actuators with a cable length of < 10 m can be connected using unshielded twisted-pair cables.



Connect analog actuators with a cable length of > 10 m using shielded twisted-pair cables.

Connect one end of the shielding to PE. Fold the outer cable sheath back and connect the shield to the terminal via the shield -connector -clamp (with strain relief). The clamp connects the shield directly to PE on the terminal side.



Ensure that the braided shield is 15 mm longer than the strain relief, when connecting a shielded actuator cable to the -I/O connector. Connect the actuator -cable as described in „Connecting shielded cables using the shield connector” (see p.12).

9 Connection example



Use a connector with shield connection when installing the actuators. Figure 4 shows the connection schematically (without -shield connector).

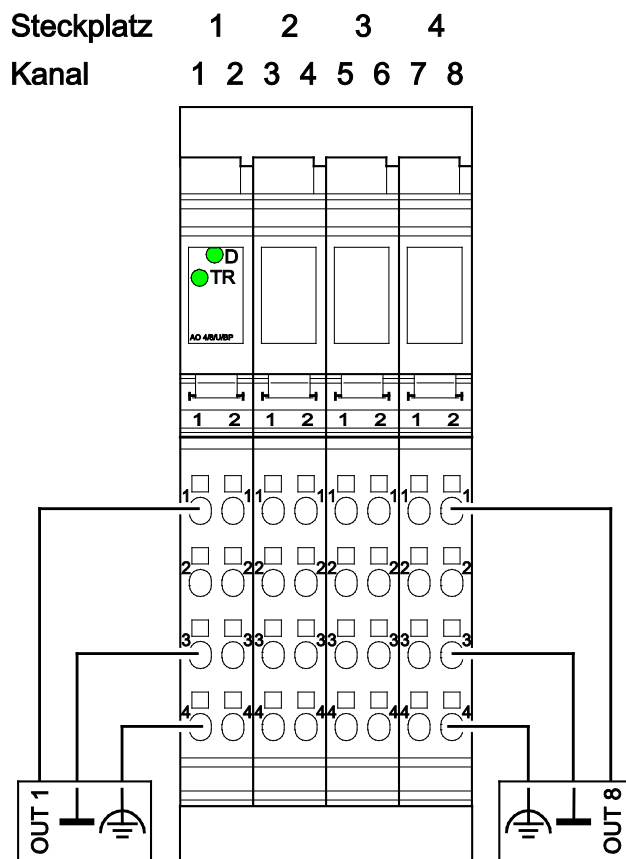


Fig. 4: Connecting actors

10 Connecting shielded cables using the shield connector

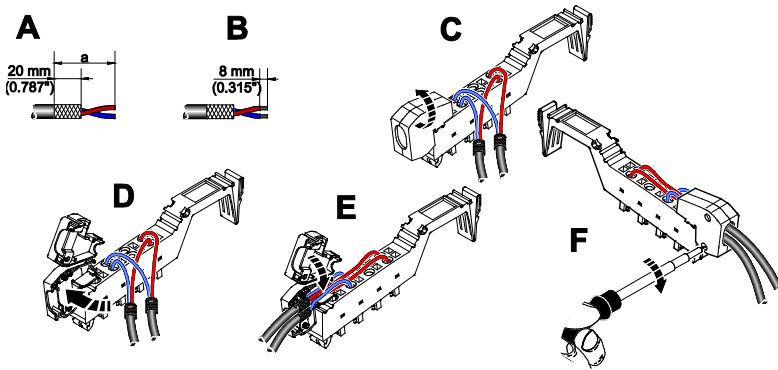


Fig. 5: Connecting the shield via shield connector



The diameter of the actuator cable is usually too large to allow the cable to be installed into the strain relief of the shield connector with sheathed and folded shield. The connection procedure for this cable therefore differs from the connection procedure described in the user manual. The comparative differences with the user manual are marked in bold text.

Connection of the cables according to Figure 5 should be carried out as follows:

Stripping Cables

- Strip the outer cable sheaths to the desired length (a). (A)
The desired length (a) depends on the connection position of the wires and whether the wires should have a large or small amount of space between the connection point and the shield connection.
- Shorten the braided shield to **20 mm**. (A)
- **Do not** fold the braided shield back over the outer sheath. (B)
- Remove the protective foil.
- Strip 8 mm off the wires. (B)



Inline wiring is normally without ferrules. However, it is possible to use ferrules. If using ferrules, make sure they are properly crimped.

Wiring Connectors (According to User Manual)

- Push a screwdriver into the slot of the appropriate terminal point, so that you can insert the wire into the spring -opening. Recommended screwdriver with blade measures of 0.6 mm x 3.5 mm.
- Insert the wire. Remove the screwdriver from the opening. The wire is now clamped.
- The connector pin assignment can be found in the table on page 8.

Connecting the Shield

- Open the shield connector (see user manual). (C)
- Place the shield connection clamp in the shield connector corresponding to the cable width (see user manual).
- Place the cables in the shield connection. (D).
Push the outer cable sheaths up to the shield connection clamp. The wires with the braided shield must be underneath the shield connection clamp. The braided shield must project approximately 15 mm over the shield connection clamp.
- Close the shield connector. (E)
- Fasten the screws for the shield connector using a screwdriver. (F)